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ABSTRACT

This paper reports the proposals of a November 4, 1975 conference of Black college and university presidents held to propose the establishment of a national plan to achieve parity of minorities in all areas of higher education and in all professional and technical fields by the year 2000. Federal fellowships for minorities and Federal grants and contracts for graduate study are recommended. At the undergraduate level, direct funding of minority science students and doubling the enrollments of traditional Black colleges producing engineers are proposed. At the secondary school level, increased minority enrollment in college preparatory mathematics courses is proposed. Statistical tables of minority student enrollment in graduate fields, enrollment in graduate schools, family income distributions, and enrollment in high school mathematics courses are presented. (SL)

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SOME GENERAL PROPOSALS FOR INCREASING THE PRODUCTION OF MINORITY PROFESSIONALS IN THE BASIC SCIENCES

A Conference on Minorities in Science
American Association for the Advancement
of Science

February 19-21, 1976
Boston, Massachusetts

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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By

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On November 4, 1975, approximately one hundred presidents of Black colleges and universities met with Health, Education and Welfare Secretary F. David Mathews to propose the establishment of a national plan to achieve parity of Black and other minority representations in all areas of higher education and in all professional and technical fields by the year 2000. They were in part lead to make this proposal out of consideration of the faltering progress which is being made toward eliminating the historic gaps between white and minority family incomes.

1972 MEDIAN FAMILY INCOMES *

Whites	11,549
Chicanos	7,908
Puerto Ricans	7,613
Blacks	7,106

As the American economy becomes increasingly characterized by a scarcity of cheap resources it must become more complex and dependent on science and technology. It is, therefore, difficult to conceive how the historic gaps between minority and white family incomes can be reduced without there being a concurrent equalization of minority participation in the scientific and technical professions.

Although the achievement of parity ethnic representation in scientific and technical fields by the year 2000 is a noble objective which many can support, its achievement is most difficult because it requires not only an immediate national commitment but one which must be sustained for at least two decades. For example, if by some miracle the educational system was suddenly revamped so that all entering 7th graders had equal opportunities and prospects for receiving doctoral degrees without regards to ethnicity or race, the population of new doctorates would not be ethnically balanced until 1991 (students would enter high school in 1979, college in 1982, and graduate school in 1986 and receive doctoral degrees five years later).

Approximately 17 percent of the U.S. population is minority. In 1973, a survey of graduate institutions indicated that only 7 percent of all graduate students were minority (Table 1). In the basic sciences and engineering, Blacks constituted less than 2 percent of the graduate enrollments in these fields although they represent

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* Minorities in Engineering, A Blueprint for Action, A report of the Planning Commission for Expanding Minority Opportunities in Engineering, 1974, p. 147.

TABLE 1

Representation of Minority Students In Each Graduate Field:[1]

All Institutional Respondents
(n=154)

Field of Study[2]	Total Enrollment In Each Graduate Field		Percent Minority In Each Field				
	Number	Percent	Black	Spanish-Surnamed	American Indian	Asian American	Minority Subtotals
Arts and Humanities	53,920	100.0	2.8	1.5	0.3	0.9	5.5
Education	96,568	100.0	7.2	1.2	0.4	0.6	9.4
Engineering	31,273	100.0	1.2	0.8	0.1	3.3	5.4
Health Professions	13,238	100.0	5.5	1.2	0.6	2.0	9.3
Life Sciences	27,641	100.0	1.5	0.9	0.2	1.9	4.5
Biology	(5,027)	100.0	(2.6)	(0.7)	(0.1)	(1.7)	(5.1)
Biochemistry	(1,804)	100.0	(1.2)	(0.6)	(0.3)	(3.2)	(5.3)
Microbiology	(1,801)	100.0	(1.8)	(0.9)	(0.3)	(3.2)	(6.2)
Physiology	(1,110)	100.0	(1.5)	(0.9)	(0.3)	(2.0)	(4.7)
Other	(15,504)	100.0	(1.2)	(0.9)	(0.2)	(1.6)	(3.9)
Mathematical Sciences	12,446	100.0	2.5	0.6	0.2	2.1	5.4
Physical Sciences	21,629	100.0	1.4	0.7	0.2	2.6	4.9
Chemistry	(8,040)	100.0	(1.6)	(0.7)	(0.2)	(3.2)	(5.7)
Physics	(5,559)	100.0	(1.2)	(0.6)	(0.2)	(3.0)	(5.0)
Other	(6,560)	100.0	(1.2)	(0.7)	(0.2)	(1.5)	(3.6)
Basic Social Sciences	35,583	100.0	4.1	1.2	0.3	1.1	6.7
Economics	(5,766)	100.0	(1.9)	(0.8)	(0.3)	(1.6)	(4.6)
Psychology	(10,318)	100.0	(4.2)	(1.2)	(0.3)	(0.8)	(6.5)
Sociology	(4,566)	100.0	(5.8)	(2.0)	(0.2)	(1.3)	(9.3)
Other Basic Social Sciences	(12,969)	100.0	(4.6)	(1.3)	(0.4)	(1.0)	(7.3)
All Other Fields	80,666	100.0	5.1	1.0	0.3	1.2	7.6
Total, All Fields	372,264	100.0	4.4	1.1	0.3	1.4	7.2
Total U.S. Population, 1970			11.1	4.4	0.4	0.4	17

[1] Based on data from the 154 Ph.D. granting institutions able to provide minority enrollment data within field of study.

[2] Figures for subfields (in parentheses) sum to less than their respective field totals because some institutions reported data for the total field category but not for subfields.

Elaine H. El-Khawas and Joan L. Kinzer. ENROLLMENT OF MINORITY GRADUATE STUDENTS AT PH.D. GRANTING INSTITUTIONS; Higher Education Panel Reports, Number 19, American Council on Education, Washington, D.C., August 1974.

11.1 percent of the total population and 4.4 percent of the total graduate enrollment. Thus, in the basic sciences, engineering and the most quantitative of the social sciences, economics, Blacks are underrepresented by a factor of from 6 to 9 while for all fields the underrepresentation is approximately 2.5. It is noteworthy that in 1973 almost half (43%) of all Black graduate students were in education compared to 26% for the total graduate population.

Similar degrees of underrepresentation in the sciences exists for Spanish surname and Native Americans.

Clearly any program to achieve ethnic parity in scienfitic and technical fields must accomplish a several fold increase in minority graduate student enrollments in these fields by a multiplicity of strategies and programs. Because graduate education is diverse, national in scope and dispersed both in terms of location of institutions and their sources of students, it is helpful to divide the problem into several segments and attempt to identify the principle factors which can be adjusted to raise the enrollment of minorities in the sciences. For convenience, three segments will be discussed: graduate schools, undergraduate schools, and secondary schools (junior and senior high schools). Each of these segments has a distinctive but equally important influence and role in determining the degree of minority participation in the sciences and engineering. The modification of one segment without complementary adjustments in the others would be inefficient if not unproductive and futile.

Although it is recognized that a large number of additional areas could be identified as having influences on minority participation in the sciences, e.g., elementary schools and family attitudes, they are not specifically addressed here in the belief that the three identified segments are the most malleable of the major determinants, and as a consequence attention devoted to them will yield the greatest results in the shortest time frame.

GRADUATE SCHOOLS

Graduate education in the sciences and engineering is highly dependent on funding--funding both for graduate students and for support of their research activities. In recent years, the federal government has purposefully reduced the effective levels of support of graduate education and research. This policy of reduced support is based on a number of considerations of which a perceived excessive production of Ph.D.s is a central concern. Although the federal policy of reduced graduate fellowship support and the elimination of training grants may be a sound policy in the aggregate, it is not applicable to the situation of minority graduate enrollments and the production of minority doctorates where there is certainly no surplus either in the sciences and engineering or in the humanities and social sciences.

Given the severe underrepresentation of minorities in the sciences and the need not only to sustain the present levels of production of minority doctorates but to expand them by several fold, it is critical that the federal government, as the principle supporter of graduate education in the sciences, adopt a policy of directly encouraging and financially supporting expanded graduate education of minorities. Without such a federal commitment the parity production of minority doctorates in the sciences and engineering by the turn of the century is virtually unachievable.

Two types of approaches could be employed. First, a direct approach consisting of a program of graduate fellowships or traineeships earmarked for the financial support of minority graduate students with particular emphasis on the sciences, engineering

and other fields in which minority underrepresentation is exceptionally severe, for example, economics. Any program of support for minority graduate education to be maximally effective must recognize that the centers of minority undergraduate population are not fully coincident with the major centers of graduate education and that graduate student support programs must, therefore, include provisions for covering reasonable relocation costs and the out-of-state fees of state universities.

A second approach to support minority graduate education by indirect means would be to give special recognition in the awarding of grants and contracts to those institutions with the best records of bringing minorities into the scientific professions and the best prospects for doing so in the present and immediate future. The experiences with withholding of federal funds because of non-compliance with affirmative action policies suggest that for this approach to be most effective and fair, it must be applied on a departmental as well as institutional basis.

Table 2 provides a listing of universities in ranked order on the basis of their enrollment of Black graduate students in 1972. Although these schools vary considerably in the scope and characteristics of their graduate programs, they have one significant area of commonality which distinguishes them from other universities. They all have external relationships and infrastructures that enable them to attract and retain two hundred or more Black and other minority graduate students. These institutions, relative to other universities, are most likely and best able to accommodate increased numbers of minority graduate students both academically and socially. The awarding of grants, contracts and traineeships to these institutions is likely to have a greater beneficial impact on minority graduate education than if the awards were made to other institutions.

In a period of limited funding for graduate education and research, funding criteria must necessarily become more stringent. The inclusion in the evaluation criteria of consideration of the potential social benefits expected to accrue from funding one grant request as opposed to another could be done in a manner consistent with national policy without significant distortion of the policy of awarding grants and contacts on the basis of merit and past performance. Of the eighteen universities listed in Table 2, ten are in the top twenty largest university recipents of federal funds (extreme right column of Table 2 gives federal support rank). Obviously, the inclusion of consideration of minority enrollments in the criteria for allocation of research grants and contracts would result in some institutions, which are major recipents of federal funds, initially receiving less support and others receiving more. However, it is also clear from the federal support ranking of the universities listed in Table 2 that such a shift could occur without a significant, if any, reduction in the quality of work performed on grants and contracts.

COLLEGE LEVEL

At the collegiate level there are a large number of areas which could be identified for actions to enlarge the pool of potential minority graduate students for the sciences. However, particular attention should be directed at retaining as science majors those minority students who enter college as declared science majors. Table 3 indicates that after four years of college over eighty percent of male students with science or engineering majors entered as freshmen with those declared majors. Thus, the most productive routes for increasing the output of minorities with bachelor degrees in the sciences and engineering must be based on increasing the numbers of

TABLE 2

1972 ENROLLMENT OF MINORITIES IN U.S. GRADUATE SCHOOLS[1]

	Percentages					Federal[2] Support Rank
	American Indian	Black	Oriental	Spanish Surname	Total Enrollment	
Howard University	-	73.3	-	-	1,148	8
Atlanta University	-	92.0	2.0		840	> 100
Columbia University	0.5	6.0	2.7	1.8	4,972	12
University of Michigan	0.2	6.3	0.9	0.8	6,336	10
UCLA	0.5	5.6	5.2	4.4	6,232	2
Georgia State University	-	11.8	0.8		2,952	> 100
Wayne State University	0.3	10.7	0.4	0.4	3,084	82
Harvard University	0.3	5.4	0.7	1.4	5,924	4
N. Carolina A&T State University	-	82.4	-	-	391	> 100
Rutgers University	-	10.9	2.4	0.6	2,606	64
U.C. Berkeley	0.2	4.0	3.6	1.6	7,073	11
Michigan State University	-	6.5	1.5	1.0	4,085	26
New York University	0.1	5.9	1.1	1.8	4,286	20
University of Chicago	-	6.3	1.2	0.9	3,900	16
Federal City College	-	67.8	2.2	0.2	351	> 100
Stanford University	0.5	5.6	2.5	3.5	3,973	9
University of North Carolina, Charlotte	0.4	5.8	0.4	-	421	> 100
University of Illinois	-	4.1	0.9	0.5	5,156	19

[1]The Chronicle of Higher Education, Dec. 2, 1974. Schools ranked by number of Black graduate students

[2]Ranking by level of Federal support in fiscal year 1974. Higher Education and National Affairs, Oct. 10, 1975-5.

TABLE 3

Shifts in Career Plans (1966 to 1970) of 1966 Male College Freshmen

(In percentages; N = 462, 239)

CAREER PLANS IN 1966	CAREER PLANS IN 1970†															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Physician	39	6	4	*	3	*	5	1	7	1	3	10	2	–	14	6
2. Dentist	7	27	1	0	*	0	4	*	12	1	6	17	4	–	15	6
3. Research Scientist	3	1	25	0	2	*	10	7	2	1	6	11	3	–	20	10
4. Statistician	0	0	3	0	0	0	4	0	4	3	5	53	0	–	26	4
5. Clinical Psychologist	0	0	1	0	12	10	12	0	5	1	11	16	2	–	8	24
6. Social Worker	0	0	0	0	2	24	6	*	4	1	7	16	2	–	32	6
7. College Teacher	1	0	1	0	1	*	31	1	6	0	19	5	6	–	20	10
8. Engineer	*	*	3	*	*	*	3	41	3	1	5	19	2	–	15	7
9. Lawyer	1	0	*	0	*	1	6	1	47	0	3	16	2	–	19	5
10. Health Professional	7	0	3	0	0	0	7	11	1	15	6	19	*	–	22	9
11. Elementary/Secondary School Teacher	*	*	1	0	*	2	11	*	1	1	41	10	3	–	23	7
12. Business Executive or Owner	1	*	1	0	1	1	5	2	8	*	3	45	3	–	23	7
13. Artist	*	0	1	*	2	*	8	4	2	1	9	11	39	–	13	10
14. Housewife	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15. All others	1	1	2	*	*	1	5	3	5	2	6	18	3	–	44	9
16. Undecided	3	2	2	0	4	1	5	6	6	*	10	12	4	–	23	21

†Numbers under *Career Plans in 1970* refer to same categories listed under *Career Plans in 1966.*

Minorities in Engineering, A Blueprint for Action, A report of the Planning Commission for Expanding Minority Opportunities in Engineering, 1974.

minority students who enter as freshmen with declared science majors and increasing their retention rates in these majors.

Because science majors are more rigorous, more demanding of both time and intellectual commitment, and more distant from our daily lives and cultural experiences than the humanities and social sciences, a student, to be successful as a science major, must become acculturated in a distinct subculture--a subculture which is rigidly based on logical and quantiative methods of analysis; a subculture based on precise usage of a different language and long, tedious hours of problem sets and laboratory work. For minority students an undergraduate science major--particularly one not directed toward medical or dental school--may appear to be insufficiently rewarding and irrelevant.

A science major may be particularly unattractive to students with major financial concerns. Table 4 indicates that minority students are in general substantially more financially disadvantaged than the average college student. In 1971, over 70% of all minority freshmen came from families with incomes of less than $10,000 while only 34% of all freshmen came from such families. Clearly, financial considerations must have a major influence on minority student college enrollments and their choice of majors. Financial considerations must make those majors representing the surest routes to financial security most attractive to low income students. Amongst the technical fields only engineering offers a relatively quick route to financial security--for a bachelors degree in engineering is a professional degree which ensures a relatively high starting salary. In 1974, starting salaries for new bachelors degree holders were: engineers, $964/mo.; sciences and health professions, $821; and humanities, social sciences and business, $786.

To address the twin concerns of the financial needs of minority students and their retention in science majors the provision of funds to support undergraduate science majors working in laboratories either on work-study programs or undergraduate research projects should be expanded substantially--particularly in those institutions with large enrollments of minority undergraduates.

The provision of funds to support minority undergraduate science majors working in laboratories has the obvious double benefits of addressing the financial needs of the students and encouraging their immersion into science and scientific research. The Minority Biomedical Support Program of the National Institutes of Health, which provides support for undergraduate participation in faculty research in schools with large minority enrollments, is an excellent model for this type of program. Similar programs should be established for the physical sciences and engineering.

In a detailed analysis of Minorities In Engineering, a Blueprint for Action, it is proposed that as part of a comprehensive effort to achieve parity of minority enrollments in engineering freshmen classes by 1982 and in all classes by 1987 that the six traditional Black colleges, which have produced over half of all Black engineers, double their enrollments (Prairie View, Howard University, Southern University, North Carolina A&T, Tennessee State and Tuskegee). A similar detailed analysis of how to most effectively increase minority enrollment in the basic sciences would probably reach a similar recommendation for expansion of science programs and enrollments in the traditional Black colleges concurrent with expanded minority enrollments in undergraduate schools in general.

TABLE 4

Family Income Distribution, 1971

	U.S. POPULATION AS A WHOLE	U.S. BLACKS	ALL FRESHMEN IN ALL COLLEGES	MINORITY FRESHMEN IN ALL COLLEGES
	(2)	(3)	(4)	(5)
below $6,000	24.2%	46.9%	12.0%	43.9%
$6,000–$9,999	24.0%	25.4%	22.4%	27.7%
$10,000–$14,999	26.9%	17.2%	32.3%	17.3%
$15,000 and over	24.8%	10.6%	33.3%	11.0%

SOURCES: Columns 2 and 3: U. S. Department of Commerce, Bureau of the Census, *Money Income in 1971 of Families and Persons in the United States*, Current Population Reports, Series P-60, No. 85 (Washington, D.C., December 1972), Table 16, pp. 40–41.

Column 4: *The American Freshman: National Norms for Fall 1971* (Washington, D.C.: American Council on Education, 1971).

Column 5: Alan E. Bayer, *The Black College Freshman* (Washington, D.C.: American Council on Education, 1972), p. 39 (1971 data). Figures are national norms for Blacks only, but a survey by Bayer in the same source (p. 85) of Chicanos, Puerto Ricans and American Indians indicates that the patterns for the other underrepresented minorities are similar.

Minorities in Engineering, A Blueprint for Action, A report of the Planning Commission for Expanding Minority Opportunities in Engineering, 1974.

SECONDARY SCHOOL

The junior and senior high school years represent the critical formative years for potential scientists both in terms of career interest and academic preparation. Table 5 indicates that the preponderance of freshmen science and engineering majors had decided on scientific or technical careers by the ninth grade. The combination of this information with those of Table 3 indicates that the majority of bachelor degree scientists had chosen a scientific or technical career by the ninth grade. We are thus lead to the conclusion that efforts to stimulate an interest in science must be directed at minorities prior to the ninth grade. Since the junior high school years represent an age period in which students grow substantially in their maturity, understanding of reality, and degree of self-direction, this age grou would appear to be the most receptive to information on science and engineering careers and advice on how to prepare for such careers. The junior high school years also represent a three year block of time which can be used to bring the basic academic skills (reading, writing and arithmetic) of students up to levels sufficient for the pursuit of a high school academic program in the sciences.

For undergraduate engineering majors, the principle factors leading to attrition were:*

Academic problems	45%
Discord with Professors or courses	40%
Personal and family problems	10%
Financial problems	5%

The minor importance of financial problems for the attrition of all students probably does not hold for minority students who are twice as likely to come from low income families. The areas of most frequently reported academic weaknesses and high school deficiencies were:*

Mathematics	47
Physical Sciences	33
Natural Sciences	12
Humanities	5
Social Sciences	3

In the absence of more specific data it is reasonable to assume that similar characteristics hold for the sciences in general and for minority students in particular.

The relatively lower rates of minority student enrollment in technical fields is probably a reflection of their poorer levels of basic preparations in mathematics and science. These basic skills in mathematics and science are established in junior and senior high schools along with development of interests in technical careers. The basic mathematics curriculum in secondary schools follows the general pattern outlined in Table 6. The fundamental importance of algebra and geometry is indicated by the several tracks by which students can complete these subjects at any time between the 9th through the 12th grades and their percentage contributions to the questions on the mathematics sections of the college placement examinations. Unfortunately, minority students in many school districts are not completing these basic subjects at the same rates as students in general. Nor are they completing at sufficient rates the third year of mathematics, advanced algebra and trigometry, recommended as preparation for freshmen calculus and science majors.

* Minorities in Engineering, A Blueprint for Action, A report of the Planning Commission for Expanding Minority Opportunities in Engineering, 1974, pp. 81, 82.

TABLE 5

Proportion of High School Boys Shifting from Each Field between the Ninth Grade and One Year after High School

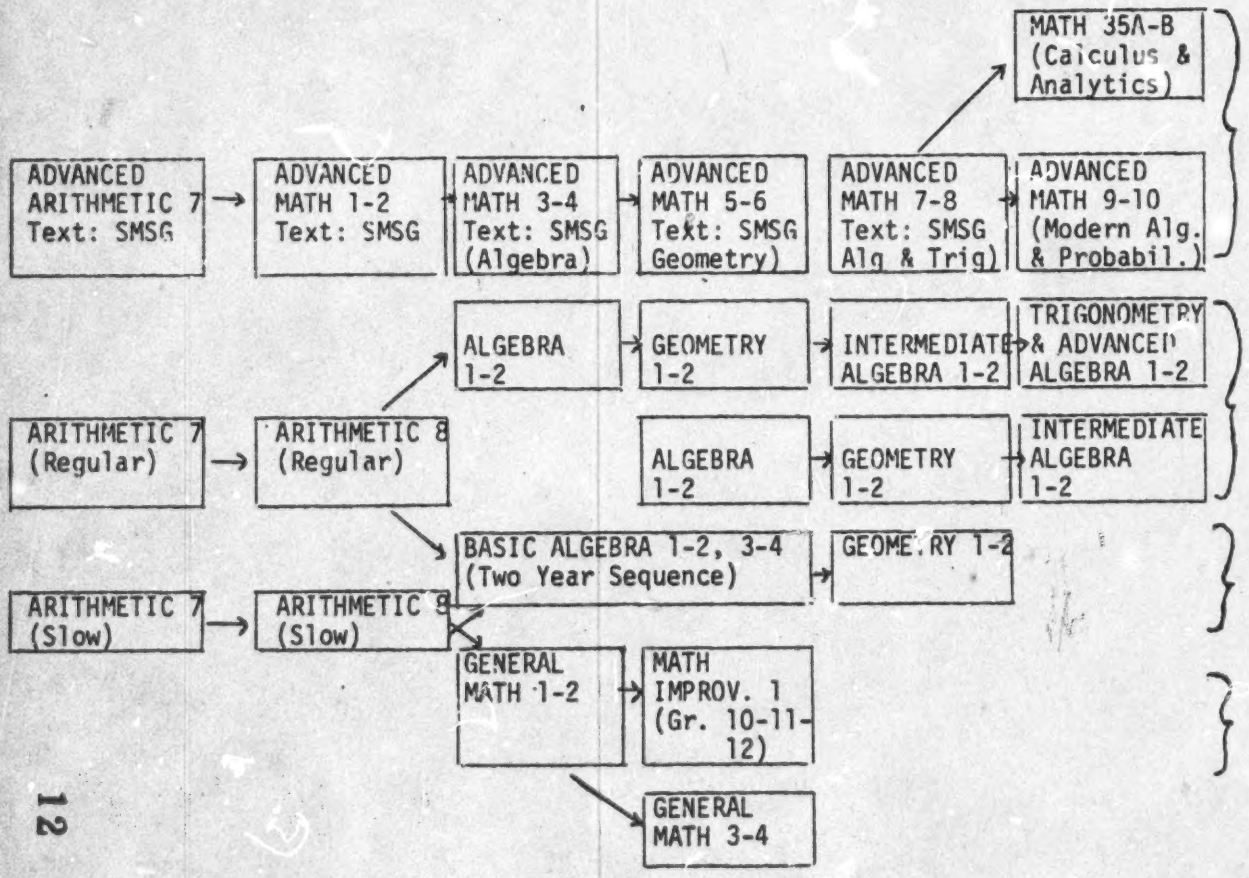
FIELD CHOICE IN THE NINTH GRADE	FIELD CHOICE ONE YEAR AFTER HIGH SCHOOL										
	1	2	3	4	5	6	7	8	9	10	11
	(PERCENTAGES)										
1. Natural Sciences	12.4	10.7	9.7	6.4	3.4	1.0	3.4	10.4	15.2	3.8	23.5
2. Engineering	5.0	20.0	13.0	3.0	3.0	1.0	2.0	8.0	21.0	1.0	23.0
3. Business	3.7	3.6	35.1	1.9	2.6	1.2	2.3	8.1	16.0	1.4	24.0
4. Health—M.D. and D.D.S.	2.4	5.6	12.7	26.3	5.4	0.6	2.2	8.3	14.4	3.2	18.8
5. Law	2.0	4.0	16.0	4.0	20.9	2.0	3.0	11.0	13.0	2.0	21.9
6. Clergy	3.1	3.1	8.9	3.1	5.1	28.8	3.1	11.0	12.0	4.1	17.9
7. Arts	1.6	1.8	10.2	1.3	1.8	1.0	25.4	11.5	13.6	3.7	28.0
8. Teaching	3.0	3.0	13.0	3.0	2.0	1.0	3.0	27.0	17.0	4.1	23.9
9. Skilled/Technical	3.1	5.8	12.6	1.5	1.7	0.6	2.0	7.0	34.0	1.5	30.2
10. Social Sciences and Services	3.6	1.8	13.8	1.8	5.4	1.8	3.0	6.0	20.3	3.0	39.5
11. Other	4.0	6.0	14.0	2.0	2.0	1.0	5.0	9.0	23.0	1.0	33.0

SOURCE: Table 6.2 of Folger, Astin and Bayer, *Human Resources and Higher Education*, Russell Sage Foundation, N.Y. 1970; based on Project TALENT data.

TABLE 6

PATTERNS FOR SECONDARY MATHEMATICS

(Arrows indicate places where students most frequently move to other levels)


7
8
9
10
11
12
Description
ADVANCED ARITHMETIC 7 Text: SMSG
ADVANCED MATH 1-2 Text: SMSG
ADVANCED MATH 3-4 Text: SMSG (Algebra)
ADVANCED MATH 5-6 Text: SMSG Geometry)
ADVANCED MATH 7-8 Text: SMSG Alg & Trig)
ADVANCED MATH 9-10 (Modern Alg. & Probabil.)
MATH 35A-B (Calculus & Analytics)
For talented college preparatory pupils whose careers require strong mathematics background. May be elected by interested and talented students. Math 35A-B is a college level course, 6 semester units.
ARITHMETIC 7 (Regular)
ARITHMETIC 8 (Regular)
ALGEBRA 1-2
GEOMETRY 1-2
INTERMEDIATE ALGEBRA 1-2
TRIGONOMETRY & ADVANCED ALGEBRA 1-2
ALGEBRA 1-2
GEOMETRY 1-2
INTERMEDIATE ALGEBRA 1-2
For college preparatory pupils whose careers require mathematics background. Some terminate their mathematics after Intermediate Algebra, depending upon their chosen field.
ARITHMETIC 7 (Slow)
ARITHMETIC 8 (Slow)
BASIC ALGEBRA 1-2, 3-4 (Two Year Sequence)
GEOMETRY 1-2
For students at grade level or below. May be college potential but are not ready to take algebra at the usual pacing.
GENERAL MATH 1-2
MATH IMPROV. 1 (Gr. 10-11-12)
GENERAL MATH 3-4
For students below grade level. Many will terminate their mathematics at the end of the 9th grade.

College Entrance Examination Board Test (CEEB): 32% algebra, 34% geometry

American College Test (ACT): 48% algebra, 38% geometry

If student answers one-third of CEEB questions correctly, student's score will be higher than 60% of high school seniors and higher than 30% of those who enter college.

Table 7 provides illustrative data on the lower rates of enrollments in mathematics courses of minority students in a single California school district. Since algebra is a prerequisite for college preparatory chemistry and geometry is a prerequisite for college preparatory physics, efforts to increase minority student enrollments in these two basic mathematics courses (as well as a third year of mathematics) must, therefore, be central to any program to achieve increased minority participation in scientific and technical fields. Without vigorous national and local programs to increase the enrollments of minority secondary school students in these mathematics courses, programs at the collegiate and graduate levels will be restricted in their effectiveness by a limited pool of prepared minority students.

TABLE 7

MATHEMATICS DATA FOR SELECTED HIGH SCHOOLS
IN A SINGLE DISTRICT

High Schools	Number of Seniors Per School	Percent Minority	Percent in Geometry	Graduates who have taken Advanced Algebra and/or Trigonometry
Average of 5 Schools	1000	95%	23%	12%
Average of 2 Schools	900	32	42	32
Average of 3 Schools	1100	5	49	42
District Wide		49%	40%	21%

The underrepresentation of minorities in the scientific and technical professions represents the wasting of an untapped intellectual resource which our country can ill afford. The achievement of greater minority participation in these professions should not be viewed in isolation but as part of a dedicated national commitment to make the American dream a reality for all during the last quarter of the 20th Century.